REMARKS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-17, 19 and 23 are presently active in this case. Claims 18, and 20-22 were cancelled by previous amendments. The present Amendment amends Claims 1, 12 and 16 without introducing any new matter.

In the outstanding Office Action, Claims 1-13 were rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. Claims 12, 16, and 19 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kohonen et al (IEEE Publication, IEEE Transactions on Neural Networks, vol. 11, pp. 574-585, "Self Organization of a Massive Document Collection," May 2000, hereinafter "Kohonen"). Claims 1-2, 5, 10-11, 14-15, 17, and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Sharp (International Patent Publication WO 02/27508) in view of Alahakoon et al. (IEEE Publication, IEEE Transactions on Neural Networks, vol. 11, iss. 3, pp. 601 - 614, "Dynamic Self-Organizing Maps with Controlled Growth for Knowledge Discovery," May 2000, hereinafter "Alahakoon"). Claims 3-4 and 6-9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Sharp in view of Alahakoon, in further view of Kohonen. Claim 13 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Kohonen in view of Alahakoon.

In response to the rejection of Claims 1-13 under 35 U.S.C. § 101 as being directed to non-statutory subject matter, independent Claim 1 is amended to recite "[a]n information retrieval system implemented on one or more data processors." These features find non-limiting support in Applicants' disclosure as originally filed, for example at page 4, lines 16-28, and at page 13, lines 11-25, and in figure 10, reference numeral 530. No new matter has

been added. In light of the amendments to independent Claim 1, Applicants respectfully request that the rejection of Claims 1-13 under 35 U.S.C. § 101 be withdrawn.

In response to the rejections of Claims 1-11 under 35 U.S.C. §§ 102(b) and 103(a), Applicants respectfully request reconsideration of these rejections and traverse the rejections, as discussed next.

Briefly summarizing, Applicants' Claim 1 is directed to an information retrieval system in which information items map to respective nodes in an array of nodes by mutual similarity of said information items, so that similar information items map to nodes at similar positions in said array of nodes to form a self-organizing map. The information retrieval system includes, *inter alia*: a graphical user interface configured to display a representation of nodes of the organized map as a two-dimensional display array of display points within a display area on a user display; ***a comparator configured to compute a quantization error of a newly received information item and comparing the error to the organized map, and configured to retrain the organized map when the quantization error is above a predetermined threshold.***

Next, the features of Applicants' Claim 1 as discussed in the disclosure are explained in a non-limiting example. By retraining the self-organized map when (a) a new information item is added and (b) only if the quantization error exceeds a predetermined threshold, the overall processing power required may be reduced below a level of processing power that would be required if the map were trained *every time* a new information item was added. This can reduce the ease of use, because a user may become used to positions of commonly accessed information items on a map. Therefore, with the features of Applicants' Claim 1, it is possible to retrain the map only when it is necessary. Please note that the discussion of the features related to the comparator of Applicants' Claim 1 is for explanatory purposes only, and is not intended to limit the scope of the claims in any fashion.

The pending Office Action confirms that the reference Sharp fails to teach a comparator configured to compute a quantization error of a newly received information item and comparing the error to the organized map, and configured to retrain the organized map when the quantization error is above a predetermined threshold, as required by Applicants' Claim 1. (Office Action, p. 6, ll. 18-21.) However, the Office Action rejects this feature based on pages 603-605 of the reference Alahakoon, and also assumes that the combination of Sharp and Alahakoon is proper. (Id, p. 7, ll. 1-9.)

Moreover, in responding to Applicants ' last Amendment, the outstanding Office Action asserted that Alahakoon teaches "a comparator configured to retrain the organized map when the quantization error is above a predetermined threshold." (Office Action, p. 14, ll. 4-15.) But the pending Office Action is misstating the features of Applicants' independent Claim 1. Applicants' Claim 1 requires the following:

> a comparator configured to compute ***a quantization error of a newly received information item*** and comparing the error to the organized map, and configured to retrain the organized map when the quantization error is above a predetermined threshold.

(Claim 1, portions omitted, emphasis added.) In other words, Claim 1 requires that the comparator (i) computes a quantization error of a newly received information item, (ii) compares the quantization error of the newly received information item to the organized map, and (iii) retrains the organized map in a case when the quantization error of the newly received information item is above a predetermined threshold. The features (i), (ii) and (iii) are clearly not taught by Alahakoon, as next discussed.

The reference Alahakoon describes a dynamic self organizing map (GSOM) with controlled growth, in which the training of the map includes an initialization phase, a growing phase, and a smoothing phase. (Alahakoon, p. 604-606, Sections A, B, and C.) Within the growing phase, Alahakoon explains that an error can be calculated for each node, and a total

quantization error *QE* for ***all*** the nodes can be calculated. (Id., p. 604, col. 2, ll. 27-37.) Alahakoon further explains "[t]he total quantization error *QE* is used as a measure of determining when to generate new neuron" during the growing phase of the self-organizing map. (Id., p. 604, col. 2, ll. 40-46.) This will reduce the likelihood that too many input vectors will be accumulated on a single neuron. (Id., p. 604, col. 2, ll. 1-12). The newly generated neuron is then trained to fit the neighborhood weights. (Id., p. 605, col. 2.) The growth phase is terminated when there is a low frequency of node growth. (Id., p. 606, col. 1, ll. 1-12.) Alahakoon further explains that the map is smoothed to reduce quantization errors. (Id., p. 606, col. 1, ll. 12-27.)

In light of the above discussion, Alahakoon fails to teach a comparator configured to retrain the organized map when the quantization error of the newly received information item is above a predetermined threshold, as required by Applicants' Claim 1. In Alahakoon, the quantization error is only used when the map is initially generated ***before*** the node is trained, and a new node is generated based on a quantization error, as discussed above.

As further discussed in Alahakoon, his growing phase of the GSOM does not retrain the map, but merely grows the number of nodes, and the trains those nodes during the generation of the map. Moreover, the way in which the GSOM is grown means that the set of input vectors is fixed, the GSOM in Alahakoon starts with 4 nodes, and is grown according to account for the input vectors. (Alahakoon, p. 605, col. 1, ll. 31-36, Figs. 3-4.) Accordingly, even if we assume that Alahakoon's growth phase is *in arguendo* considered a training of a map, Alahakoon uses only one set of input vectors to generate the map, and grows the map in dependence upon a total quantization error *QE*, as explained above. In Alahakoon, the set of input vectors is fixed, and the number of nodes is adjusted to accommodate those input vectors so as to generate a GSOM.

Therefore, even if the combination of Sharp and Alahakoon is assumed to be proper, the cited passages of the combination fail to teach every element of Applicants' Claim 1. Accordingly, Applicants respectfully traverse, and request reconsideration of this rejection based on these references.

Independent Claim 17 recited features that are analogous to the features recited in independent Claim 1, but directed to an information retrieval method. Accordingly, for the reasons stated above for the patentability of Claim 1, Applicants respectfully submit that the rejections of Claim 17 are also believed to be overcome in view of the arguments regarding independent Claim 1.

In addition, Applicants' impendent Claims 12 and 16 have been amended to recite "display nodes that have substantially identical or identical information items at different locations arising from an application of the dither component," and to recite "the dither component is a random addition to a node position of up to a half of a separation distance between adjacent nodes." These features find non-limiting support in Figure 6. No new matter has been added.

Applicants respectfully request reconsideration of the rejection of independent Claim 12 under 35 U.S.C. § 102(b), and traverse the rejection, as discussed next.

Briefly summarizing, Applicants' Claim 12 is directed to an information storage system in which information items are processed so as to map to respective nodes in an array of nodes by mutual similarity of the information items, such that similar information items map to nodes at similar positions in the array of nodes to form a self-organizing map. The information storage system includes, *inter alia*: mapping logic configured to map each feature vector to a node in the self-organizing map, ***the mapping between information items and nodes in the array including a dither component configured to display nodes that have substantially identical or identical information items at different locations arising from an***

application of the dither component in a display area to visibly distinguish the nodes having substantially identical or identical information items, wherein the dither component is a random addition to a node position of up to a half of a separation distance between adjacent nodes.

Next, the features of Applicants' Claim 12 as discussed in the disclosure are explained in a non-limiting example. The use of a dither component which is a random addition to a node position of up to a half the node separation has an advantage that similar or identical information items, which usually would tend to map to similar or identical nodes, can still be distinguished from each other. (See Specification, p. 10, ll. 27-30.)

Applicants respectfully submit that the applied reference Kohonen fails to teach "a dither component configured to display nodes that have substantially identical or identical information items at different locations arising from an application of the dither component in a display area to visibly distinguish the nodes, wherein the dither component is a random addition to a node position of up to a half of a separation between adjacent nodes," as required by Applicants' Claim 12.

Kohonen's Fig. 6 shows a group of nodes that are formed into clusters, where nodes are displayed as ***a regular hexagonal array***, after a user has performed a keyword search. In addition, associated to hexagonal array, eight text items are displayed in the upper portion of Fig. 6. (Kohonen, Fig. 6, Table a, "Production of color filter substrate for liquid," etc.) These eight items in "Table a" correspond to the nodes shown on the screen. Regarding these subsections of a node, it is shown how three nodes relate to eight different information items (Kohonen, p. 583, Section D, Results, see also "unit a" in Fig. 6.) It is clear from the teachings of Kohonen that in order to view all the information items for a single node, the user will have to zoom in . This feature will slow down searching, or it may even happen that

some similar information items will be overlooked by the user, because they are likely to map to the same node.

Moreover, Kohonen fails to teach that "the dither component is a random addition to a node position of up to a half of a separation distance between adjacent nodes." Kohonen is silent on such a feature, and merely shows a regular hexagon array of nodes. (Kohonen, Figs. 5-6.) As can be seen in Kohonen's Figure 6, the circles indicating the best match are not randomly added positions around a node position, but arranged in a fixed triangular position of a hexagon array towards each other.

The reference Alahakoon fails to remedy the deficiencies of Kohonen, even if we assume that the combination of these references is proper. Alahakoon describes a self-organizing map in which nodes are arranged in a *regular square array*. (Alahakoon, Fig. 7.)

Therefore, even if the combination of Kohonen and Alahakoon is assumed to be proper, the cited passages of the combination fail at least to teach the features related to the dither component of Applicants' Claim 12. Accordingly, Applicants respectfully traverse, and request reconsideration of this rejection based on these references.

Independent Claim 16 recites features that are analogous to the features recited in independent Claim 12 directed to a information storage method. Accordingly, for the reasons stated above for the patentability of Claim 12, Applicants respectfully submit that the rejection of Claim 16 is also believed to be overcome in view of the arguments regarding independent Claim 12.

The present amendment is submitted in accordance with the provisions of 37 C.F.R. § 1.116, which after Final Rejection permits entry of amendments placing the claims in better form for consideration on appeal. As the present amendment is believed to overcome outstanding rejections under 35 U.S.C. §§§ 101, 102(b) and 103(a), the present amendment places the application in better form for consideration on appeal. In addition, the present

amendment is not believed to raise new issues because the changes to Claims 1, 12 and 16 are of a minor nature. It is therefore respectfully requested that 37 C.F.R. § 1.116 be liberally construed, and that the present amendment be entered.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance, and an early action favorable to that effect is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicants' undersigned representative at the below listed telephone number.

Respectfully submitted,

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